The Chippewa Cree
Geographic Information System

Montana Land Information Act Grant Application Fiscal Year 2013

Submitted by the Chippewa Cree Planning Department

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Date Submitted (Required): February 15, 2013
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Step – 1 Relevance and Public Benefit

The Chippewa Cree Geographical Information System (CCGIS) project will meet several of the objectives of the Montana Land Information Act (MLIA). The Chippewa Cree Tribe is proposing to develop the Chippewa Cree Geographic Information System. This system is to be an integral part of a larger tribal geospatial data capture and management strategy for the Chippewa Cree Tribe. The use of a CCGIS is very important to the Chippewa Cree Tribe of the Rocky Boy's Indian Reservation. This geospatial data capture and management scheme will grow to be a large positive contribution to the biography of our people and this landscape. Its history will not only be the story of our past, it will guide the future of our geospatial data capture and management standards.

The goals of this project are straightforward. The CCGIS will standardize and establish a best practice standard to recording geospatial data on the reservation. In the past there has been a variety of methods used, some have been very good, and others have not. Up until the establishment of the Chippewa Cree Planning Department, the input from various department heads from all tribal departments was minimal. Part of this project will be to establish standardized methods for recording and mapping the natural and artificial land characteristics of Montana's Rocky Boy Indian Reservation. This will be done utilizing current Department of the Interior standards, while incorporating traditional insights and protocol of the Chippewa Cree people. The method has been developed over the last several years, and with the help of this grant, it will be formalized and implemented as standard practice. With the partnership to the various tribal departments the CCGIS would include developing multiple layers of GIS data, including information that could be shared with the State of Montana for inclusion in the Montana State Library. Other portions, which are more sensitive in nature to the Chippewa Cree people, would be shared only on the crudest level while the detailed cultural information would be housed in a secure database within the Chippewa Cree Tribe.

Setting up the CCGIS will improve communication (between tribal, state and federal departments), development, education, and community outreach. As the reservation continues to grow, development will proceed. One of the concerns of the tribe is the effective planning and efficient management of the resources on Rocky Boy; this includes geospatial data. In planning, geospatial data are one of the first concerns. By having the CCGIS system in place, it would save time and money by streamlining the communication between the various tribal, state, and federal department managers and the developers. Part of the design of the CCGIS would also be to communicate with the public.

Our tribe undertook a process of recording our elders telling the history of the reservation. These oral accounts have been linked to specific places, and then, where appropriate; made available in conjunction with a map of their location. With these oral accounts and geographic information, a walking history was created where students from the community and interested people could download the tracks onto their ipod, mp3 player, or smart phone and take a self-guided tour with the community's elders guiding them through the history of these locations. In turn the history of our people is better preserved. This information, was made part of the walking tour and is disseminated efficiently and cost effectively through the Chippewa Cree Cultural Resource web site. Inevitably, similar type projects will stem from the institution of this overall CCGIS.

Step 3 – Scope of Work Narrative

We as the Chippewa Cree nation are committed to managing our distinct culture and identity and passing our heritage on to the next generation by way of prudent management of geospatial information. This proposal stems from the development of the Chippewa Cree Geographic Information Strategic Plan (CCGISP). The CCGISP plan was developed within this past year and goes hand in hand with the MLIA. The Rocky Boys Indian Reservation, our homeland, is comprised of a beautiful landscape that preserves a memory of the beliefs, customs and traditions of our people. In one recent project that was completed it was noted that much of our current land base is known but not mapped. As an example the general whereabouts of sacred sites of importance is known, and specific and exact information of their locations was unavailable. This was indicative of a loss of cultural knowledge, which is becoming increasingly acute. As an oral culture, the great body of tribal lore and history was preserved orally on the lips of the elders. As a tribe we have reached the point where that generation, the generation that speak the language and received the fullness of the tradition, is passing into history and with them will go forever much of the richness of the culture. The intelligent use and management of geographically referenced data in this scenario proved to render exceptional results in terms of conservation of a large part of our tribal history; a very worthwhile project. The primary goals of the current project are similar to that project in that we are making the effort via this grant to capture and manage all tribal geospatial data. Doing this we will be better suited to plan, identify, map, record, preserve, and educate the younger generation of tribal members and the public in general about the history, infrastructure, land use, analysis, and future culture of the Chippewa Cree people and our land base.

The Specific Goals of this project are:

a) Improve tribal GPS Capacity and Capability

a) Objective 1 – Obtain Hardware and software

b) Objective 2 – Training on GPS data collection and importing data into the CCGIS

b) Collect Geospatial Data

a) Objective 1 – Implementation of CCGIS Geodetic Standard Coordinate System

b) Objective 2 – Complete Metadata

c) Prioritize the Mapping and Analysis Needs of the Tribe

a) Objective 1 – Hold Meeting with various tribal departments to identify specific mapping and analysis needs

b) Objective 2 – carry out data collection and execute mapping and data analysis

- **Goal 1) Improve Tribal GPS Capacity and Capability**

Because GIS technology is computer-driven, an integral part of its success is that of installing and maintaining proper hardware. While GIS technology helps to streamline the operations of a facility, it also requires specific computer configurations in order to function properly and reliably. The Tribe currently doesn't have a server to distribute all of our data and most personnel are working on desktops or laptops. Currently, our Tribe's hardware is mostly inadequate for ideal sharing of data for a GIS operation.

In order for a GIS to be user-friendly, reliable, and compatible with the needs of the Tribe, proper software must be utilized. An important first step leading toward successful GIS implementation was the assessment of software within the organization, its uses, and the level of comfort and satisfaction of the end-users.

Existing computers are equipped with Microsoft® operating systems and Microsoft® Office products, along with ArcInfo®. Most staff is familiar with Microsoft® Office products, including Word and Excel. Some Tribal staff has good experience with ArcInfo®. The majority of their design work for the water distribution is done using ArcInfo® Info Water. Within the tribal planning department three ArcInfo licenses are being used and other tribal departments are using ArcInfo, such as the Office of Environmental Health which is using an ArcInfo license for mapping of leases, housing units, and agreements. While other surveying data and design work is done in Carlson CAD®. Most Tribal staff will use ESRI® ArcInfo®, but some staffers are capable in the operation of Carlson CAD® as well. ESRI® and Carlson CAD® can produce compatible data formats.

- **Objective 1 – Goal 1) Obtain Hardware and software**
    - Hardware and Software are critical components of the CCGIS. Properly configured hardware and appropriate software can make the difference between a marginal system and one that is considered superior. An optimal desktop computer system configuration complete with an HP plotter is shown in Table 1 below.
    - For maintenance of the data it is important to be able to collect data in the field. GPS units are required which will provide mapping grade accuracies. Trimble GeoXH and Yuma are required for this. Both of these units need software for downloading and/or post-processing collected data. GPS Pathfinder Office is required for this. Displayed in Table 2 is the CCGIS GPS hardware cost analysis.
- **Objective 2 – Goal 1) Training on GPS Equipment, data collection and importation of spatial data into GIS**

- Proper training is essential to enable personnel to be comfortable and productive with the CCGIS. Training will be developed and will be administered to all initial GPS users. The training will be administered by the tribal GIS Coordinator. A two-day session will be planned to train the operators with the use of the equipment and the overall CCGIS.

- **Goal 2) Collect Geospatial Data**

The first project to be completed with the newly acquired equipment is the mapping of logging units for the tribal Natural Resources Department. An urgent need for sub meter accurate geospatial data has been identified by the tribal forester William LodgePole. Within his department William does his best with what little he has in managing the tribal forests. His current most pressing challenge is preventing and controlling the devastating effects of the mountain pine beetle. Employing the use of geospatial data in the form of logging unit layers in an effort to control the pine beetle will help our tribe be better suited to make management and planning decisions accordingly. This project and many others to follow will subsequently lead to the completion of our objective one for goal two.

- **Objective 1 – Goal 2) Implementation of CCGIS Geodetic Standard Coordinate System**

  - All geospatial data collection and mapping will be compiled on a common coordinate system to ensure compatibility between internal and external data sets. The coordinate system for GPS data collection and mapping is listed here:

  - Horizontal Datum: North American Datum of 1983, (NAD83 – NSRS2007)

  - Projection: UTM North Zone 12

  - Map Units: Meters

- The coordinate system listed above is the most commonly used, current geodetic projection system for the project area, Rocky Boy, by different agencies and departments. The system was chosen for its accuracy, compatibility with GPS and GIS applications, and compatibility with other mapping sources such as BIA and Natural Resources Department. These mapping projection parameters are fully supported by ESRI® ArcInfo® ® as well as many other mapping, design, and GIS software programs. Many public domain data sets are published in the projection, meaning that information such as soils and census data can be added to the GIS with relative ease and at little or no cost. As the system develops, adding data sets further enhances the value and expands the usability of the CCGIS.

- **Objective 2 – Goal 2) Complete Metadata**

    - Metadata is a very important part of any dataset. A standard CCGIS metadata form will be developed. For all geospatial datasets collected a standard metadata form will be completed. The type of information to be documented in the metadata will include but will not be limited to: Dataset Identification Information, Data Quality Information, Spatial Data Organization Information, Spatial Reference Information, Entity and Attribute Information, Distribution Information, Metadata Reference Information, and Full FGDC Metadata in XML format. Including this level of detail in the metadata will significantly bolster the integrality of the CCGIS.

- **Goal 3) Prioritize and execute the Mapping and Analysis Needs of the Tribe**

The prioritization and execution of mapping and geospatial analysis for the various Chippewa Cree tribal departments is critical to the overall success of the CCGIS. Meetings between the GIS Coordinator and tribal departments will be scheduled and geospatial needs will be assessed leading to the completion of objective one of goal three.

- **Objective 1 – Goal 3) Hold Meetings with various tribal departments to identify specific mapping and analysis needs**

    - During the meetings between the GIS Coordinator and tribal departments geospatial data needs will be assessed. A standard form will be developed to collect this information.

- **Objective 2 – Goal 3) Carry out data collection and execute mapping and data analysis**

    - With the geospatial needs analysis complete, the next step will be to get out and collect the needed geospatial data for the different departments. This is a very exciting part of the process as this is where all data collected will be converted into the standard geodetic coordinate system and the metadata will be created. This will in turn lead to a strong CCGIS. From this point the tribe will be better suited to make well informed decisions related to geospatial data for the betterment of all tribal members and our land management departments.

Goal/Objective	2013										2014		
	March	April	May	June	July	August	Septermber	October	Novermber	December	January	February	
Obtain GPS Equipment		30	60	100									% Complete
Collect Geospatial Data and Implementation of CCGIS Geodetic Standard Coordinate System				30	60	100							
Complete Metadata						10	70	100					
Prioritize and execute the mapping and analysis needs of the tribe								10	20	30	40	50-100 (ongoing)	

Step 4 – Project Management and Organizational Capability

Project Manager

Ronald LodgePole, Chippewa Cree GIS Coordinator

The Chippewa Cree tribe recently hired Ronald LodgePole as the tribal GIS Coordinator. He is an enrolled member of the Rocky Boy's reservation and is culturally grounded in the Chippewa Cree Tribes. He is a graduate from MSU – Bozeman and holds a Bachelor of Science degree in Land Resource Analysis & Management and an M.S. Degree in Land Resource & Environmental Science. He is well qualified to orchestrate and execute the plan of action from this point to project completion. This project will be mediated through the Chippewa Cree Planning Department (CCPD). Similar projects that have been completed include the various course assignments, projects, and consultations the projects GIS Coordinator, has completed through years of GIS class and fieldwork at Montana State University (MSU) – Bozeman. All classwork completed are all levels of GIS/GPS courses, offered at MSU:

GPHY 284 – Intro to GIS Science & Cartography
LRES 357 – GPS Mapping
GPHY 384 – Adv GIS and Spatial Analysis
GPHY 484 – Applied GIS & Spatial Analysis
GPHY 504 – Graduate Level – GIS Research Fundamentals

All courses and project completion took place under the direction of Stuart Challendar, MSU Bozeman's GIS Professor and president of GeoPlan, Inc. GIS coursework included projects similar in scope to this project. This includes but is not limited to compilation, evaluation, and optimization of geospatial data, GIS system data validation and quality control, implementation of geodetic standards, and data dissemination.

Key Personnel

- **Keith Gopher**

    - Keith Gopher is the Chippewa Cree Wetlands Coordinator and works in the Chippewa Cree Tribal Water Resource Department (TWRD). For many years Mr. Gopher has been central to the tribes GIS database, having participated in all GIS related projects for TWRD. In addition, Mr. Gopher is a ceremonial leader for the tribe. His GIS experience and closeness with the culture is an assurance of the quality and skills needed.

- **Wes Kirn**

    - Wes Kirn is an experienced surveyor and works for the Chippewa Cree Tribe in several capacities. He is the man people turn to for surveys and knowledge of survey equipment on Rocky Boy. Mr. Kirn has operated surveyor grade GPS equipment for a wide variety of projects from seismic surveys to construction projects. Mr. Kirn is skilled at slope staking, point staking, cross-section work, volumetric surveys, grade checking, and is very experienced with the TDS survey program and its abilities. Mr. Kirn's skill and expertise will be invaluable to ensuring professional quality of all GIS maps.

Project Partners

Project partners include all departments within tribal jurisdiction, which includes the Tribal Housing Department (THD), Tribal Water Resources Department (TWRD), Tribal Natural Resources Department (TNRD), Chippewa Cree Health Board.

Step 5 – Budget Justification Narratives and Tables

Category	MLIA Share	Applicant Share	Other Share	Total
a. Personnel		$31,200.00		$ 31,200.00
a.1 Fringe Benefits (22.82%)		$ 7,119.84		$ 7,119.84
b. Travel				
c. Equipment	$59,148.00			$ 59,148.00
d. Supplies				
e. Contractual				
f. Other (indirect 5%)	$ 2,957.40			$ 2,957.40
Totals	**$62,105.40**	$38,319.84		$100,425.24

a) 50% of FTE for tribal GIS Coordinator and associated Fringe at 22.82% will be used as tribal match.
b) Travel – No travel will be associated with this grant.
c) Equipment – See table below.

Item	Quan.	Unit Price	Total Price
Trimble Yuma Tablet with GPS Pathfinder ProXH Receiver	3	$6,495.00	$19,485.00
TerraSync Professional Software with GPS Analyst Software	3	$2,995.00	$8,985.00

TerraSync Professional Software with GPS Pathfinder Office Software	3	$2,995.00	$8,985.00
+Trimble LaserAce 1000 Rangefinder	3	$2,195.00	$6,585.00
Yuma Office Dock	3	$749.00	$2,247.00
Yuma Vehicle Charger (11-16)	3	$189.00	$567.00
Yuma Pole Mount	3	$179.00	$537.00
LaserAce 1000 Range Pole Bracket	3	$135.00	$405.00
Yuma Vehicle Mount	3	$120.00	$360.00
LaserAce 1000 AC Battery Charger	3	$75.00	$225.00
GeoExplorer 6000 Series / LaserAce 1000 Vehicle Power Supply, 12V	3	$50.00	$150.00
LaserAce 1000 Rangefinder Li-Ion Battery	3	$39.00	$117.00
Desktop System	1	$ 10,500.00	$ 10,500.00
		TOTAL	$59,148.00

f) The Tribe will take advantage of the allowable 5% indirect.

Authorizing Statement

I hereby certify that the information and all statements in this application are true, complete and accurate to the best of my knowledge and that the project or activity complies with all applicable state, local and federal laws and regulations.

I further certify that this project will comply with applicable statutory and regulatory standards.

I further certify that I am (by my signature) authorized to enter into a binding agreement with

the Montana Department of Administration to obtain a grant if this application receives approval.

Kenneth St. Marks

Name (print or type)

Chippewa Cree Tribal Chairman

Title (print or type)

_____

Signature and Title of Authorized Representative(s) of Public Entity Applicant

Date February 15, 2013